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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/754,935	01/10/2004	Romney R. Katti	H0004883-1600	9236

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EXAMINER
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LAM, DAVID

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/754,935

Applicant(s)

KATTI, ROMNEY R.

Examiner

David Lam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-8 and 20-26 is/are allowed.
- 6) ☒ Claim(s) 9,12-15 and 17 is/are rejected.
- 7) ☐ Claim(s) 10,11,16,18 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/04; 7/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference number “1318” on page 28, line 1 for Figure 13. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “1208 on Figure 12” has been used to designate both *word line*, *bit line*, *driver* and *MTJ*. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the

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applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

3. Claim xx objected to because of the following informalities: In claim 17, line 6; "the conducting layer" should be change to -- a conducting layer --. Appropriate correction is required.

### *Specification*

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim 9 rejected under 35 U.S.C. 102(e) as anticipated by Nahas et al. (6,859,388).

Regarding to claim 9, Nahas et al. (6,859,388) disclose a magnetoresistive memory device comprising: a magnetoresistive element (60); a word line arranged near the

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magnetoresistive element for switching a state of the magnetoresistive and for applying a bias field to the magnetoresistive element; a bias driver (18) electrically connected to the word line for applying a bias current to the word line; a write driver (16) electrically connected to the word line for applying a switching current to the word line. *See Figs. 1-3; Cols. 2-5.*

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 12-14 are rejected under 35 U.S.C. 102(e) as anticipated by Nahas et al. (6,859,388) in view of Reohr et al. (6,404,671).

As per above discussion, Nahas et al. disclose the claimed invention as noted above but lack an inclusion of wherein the magnetoresistive element is a giant magnetoresistive, a magnetic tunneling junction, an anisotropic magnetoresistive element. However, Reohr et al. disclose a magnetoresistive element can be any one of a giant magnetoresistive, a magnetic tunneling junction, and an anisotropic magnetoresistive element. It would have been obvious to one having ordinary skill in the art to form a giant magnetoresistive, a magnetic tunneling junction, and an anisotropic magnetoresistive element of Nahas et al. 's element to provide a low power, high-speed magnetoresistive memory device. *See Figs 1A-B; Cols. 3-4.*

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7. Claim 15 rejected under 35 U.S.C. 102(e) as anticipated by Nahas et al. (6,859,388) in view Saito et al. (6,522,573).

As per above discussion, Nahas et al. disclose the claimed invention as noted above but lack an inclusion of wherein the magnetoresistive element comprises a nonmagnetic nonconducting barrier layer sandwiched between two ferromagnetic conducting layers. However, Saito et al. disclose a magnetoresistive element (20) comprises a nonmagnetic nonconducting barrier layer sandwiched between two ferromagnetic conducting layers. It would have been obvious to one having ordinary skill in the art at the time of the invention to form a nonmagnetic nonconducting barrier layer sandwiched between two ferromagnetic conducting layers of Nahas et al.' element to provide cost effective and reliable memory device. *See Figs. 3A-D; Cols. 8-9.*

8. Claim 17 rejected under 35 U.S.C. 102(e) as anticipated by Nahas et al. (6,859,388) in view of Covington (6,865,109).

As per above discussion, Nahas et al. disclose the claimed invention as noted above but lack an inclusion of wherein the magnetoresistive element comprises an antiferromagnetic layer; a ferromagnetic pinned layer coupled to the antiferromagnetic layer; a nonmagnetic conducting layer coupled to the pinned layer; and a ferromagnetic free layer coupled to a conducting layer. However, Covington discloses a magnetoresistive element (160) comprises an antiferromagnetic layer (162 or 172); a ferromagnetic pinned layer (170) coupled to the antiferromagnetic layer; a nonmagnetic conducting layer (174) coupled to the pinned layer; and a ferromagnetic free layer (SAF) coupled to a conducting layer. It would have been obvious to one having ordinary skill in

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the art to form a magnetoresistive element comprises an antiferromagnetic layer; a ferromagnetic pinned layer coupled to the antiferromagnetic layer; a nonmagnetic conducting layer coupled to the pinned layer; and a ferromagnetic free layer coupled to a conducting layer of Nahas et al. 's element to provide a low power, high-speed magnetoresistive memory device. *See. Figs. 12-14; Cols. 7-9.*

***Allowable Subject Matter***

9. Claims 10-11, 16, 18-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is an examiner's statement of reasons for allowance: Claims 20-2 are allowable over the prior art of record because none of the prior art whether taken singularly or in combination, especially when these limitations are considered within the specific combination claimed, to teach: a magnetoresistive memory device comprising: a current, among others as claimed in independent claim 20, that supplied to a word line that cause a magnetic field to be applied to a primary magnetoresistive is of the same magnitude but opposite sign to the magnetic field applied to a complementary magnetoresistive element; a bias driver, among others as claimed in independent claim 24, that electrically connected to one or more of a plurality of word lines and configured to generate a bias current that substantially centers a biased hysteresis loop of a selected magnetoresistive memory cell.

***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Iwata et al. (6,912,152) disclose MRAM includes write word line driver.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lam whose telephone number is 571-272-1782. The examiner can normally be reached on 6:00 – 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoai Ho can be reached on 571-272-1777. The fax phone numbers for the organization where this application or proceeding is assigned is (571) 272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**D. Lam**

September 19, 2005

  
**DAVID LAM**  
**PRIMARY EXAMINER**